Setting up Automatic Switchover

Automatic switchover for incoming feeders

The company

The customer is a petrochemical company. The company's critical control processes are characterized by high energy consumption and high operating reliability requirements.

The starting situation

The project objective was to implement load transfer between busbars A and B in a switchgear unit. The customer requested automatic switchover without interruption, with the following characteristics:

- In the event of undervoltage on busbar A, circuit-breaker CB–QA trips, automatically disconnecting the bus sectionalizer CB–QC. This restores the power on bus A after a finite interruption time.
- In the event of undervoltage on busbar B, automatic transfer is performed in the same way as described above.
- When the power is restored to the tripped incoming feeder, the associated circuit-breaker (e.g. –QA) has to be closed manually. This is only permitted through the synchro-check relay. The bus sectionalizer CB (-QC) then automatically trips, provided the selector switch –S100 is in position –QC.

The requirements of the customer also included manual transfer without interruption in the following cases:

- In the initial status, incoming feeders A (-QA) and B (-QB) are closed and bus sectionalizer (-QC) is open.
- Undervoltage is detected on one of the two incoming feeders. The bus sectionalizer can be closed only when a release command is provided by the associated synchro-check relay.
- After the bus sectionalizer has been closed for a certain definite time, one of the circuit-breakers opens automatically, depending on the position of the selector switch.

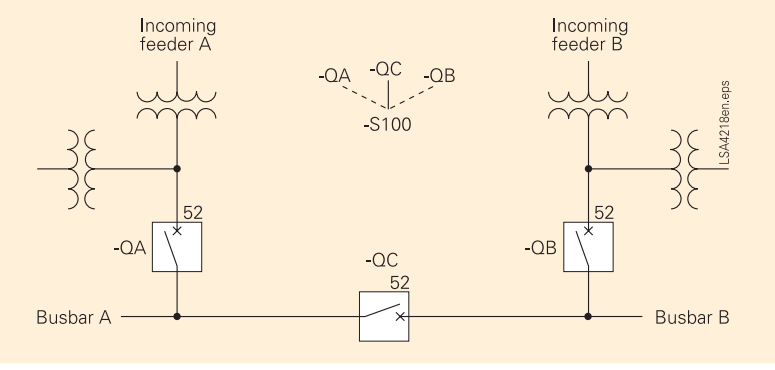

Fig. 1

The concept

The solution involves control of each circuit-breaker by a SIPROTEC 4 relay. Undervoltage detection is implemented as a function inside the incoming feeder relays. Communication between the relays is hardwired via the relay inputs and outputs. The information from the selector switch –S100 is forwarded to the relay of the bus sectionalizer.

Each relay has been programmed to control its connected circuit-breaker and to output command signals to the two other SIPROTEC 4 relays. The automated system also accepts manual commands and can operate with a separate synchro-check relay.

Conclusion

This solution was installed in 2002 and has been functioning correctly ever since. The same solution has also been implemented for 33 kV, 6.6 kV, and 400 V switchgear with SIPROTEC 7SJ63 and 7SJ62 relays


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Fig. 2
33 kV 8DB GIS, with CBs protected and controlled by 7SJ63


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Fig. 3
6.6 kV 8BK AIS, with CBs protected and controlled by 7SJ63


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Fig. 4
400 V SIVACON, with CBs protected and controlled by 7SJ62